

FIG. 1

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Summary of sequence differences between the infectious
cDNA clone and parental WNV strain 3356

Nucleotide no. ^a	Strain 3356 genome	cDNA clone	Amino acid change	Location
1285	T	C	Silent	E
3840	T	C	Silent	NS2A
7015	C	T	Silent	NS4B
7826	T	C	V → A	NS5
8067	G	A	Silent	NS5
8859 ^b	C	A	Silent	NS5
8862 ^b	A	G	Silent	NS5
8880 ^c	A	G	Silent	NS5
9123	C	T	Silent	NS5
10613	C	T	Silent	3'UTR
10783	C	T	Silent	3'UTR

^a Nucleotide position and sequence are based on WNV strain 3356 (GenBank accession no. AF404756).

^b Mutations were designed to generate an endonuclease *StyI* site as a marker for recombinant virus.

^c This mutation was designed to knock out the endonuclease *EcoRI* site as a marker for recombinant virus.

FIG. 2

Genome
Transcript

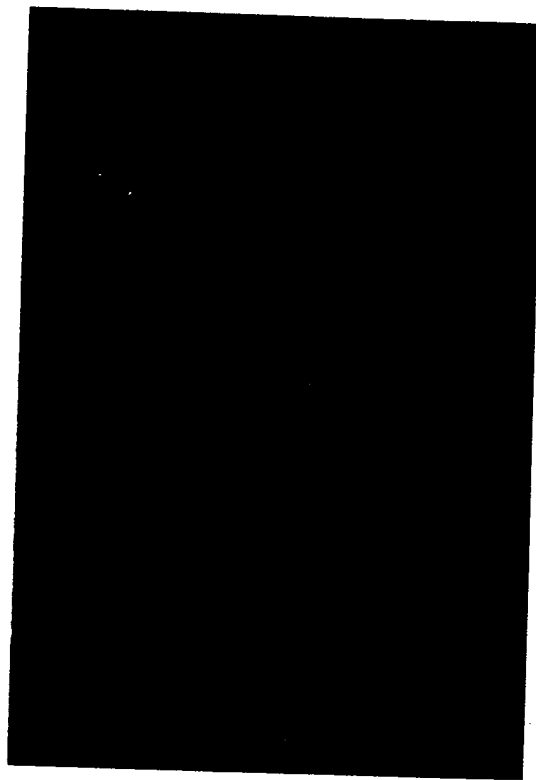


FIG. 3

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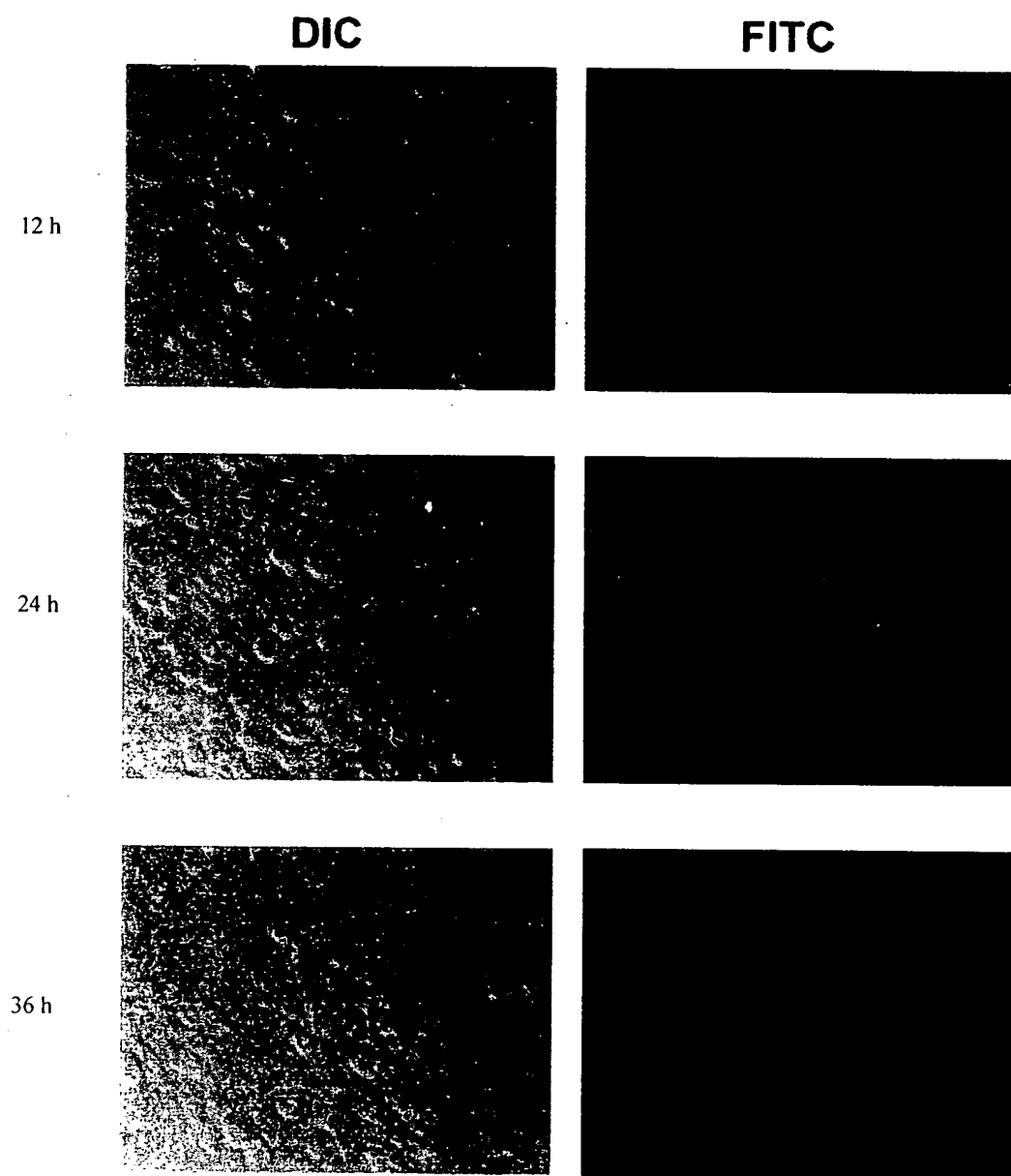


FIG. 4

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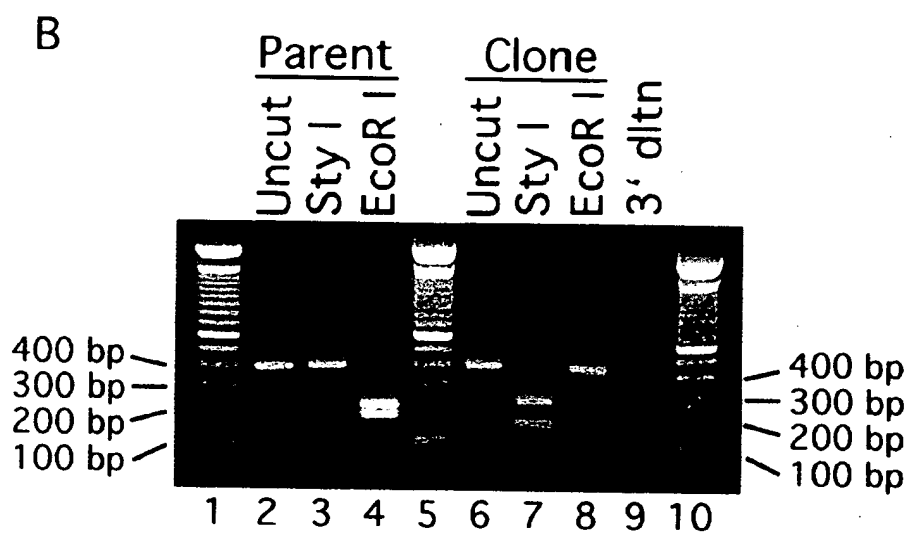
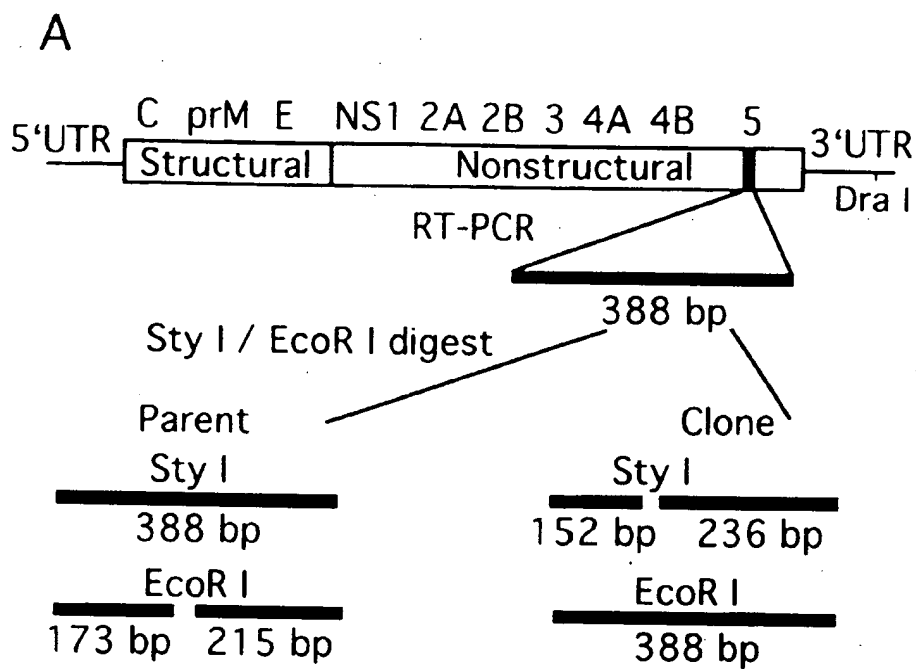


FIG. 5

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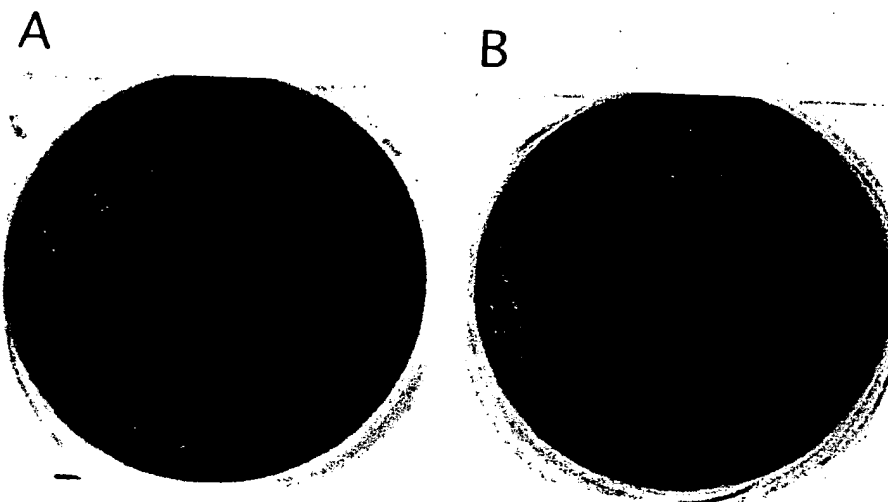


FIG. 6

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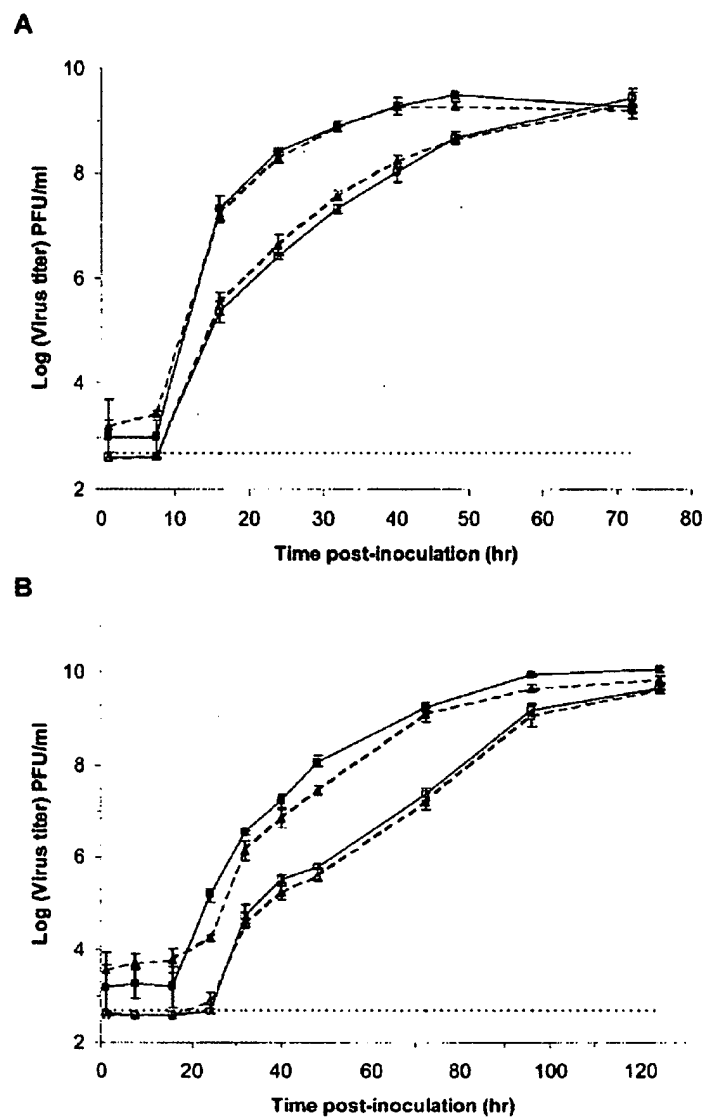


FIG. 7

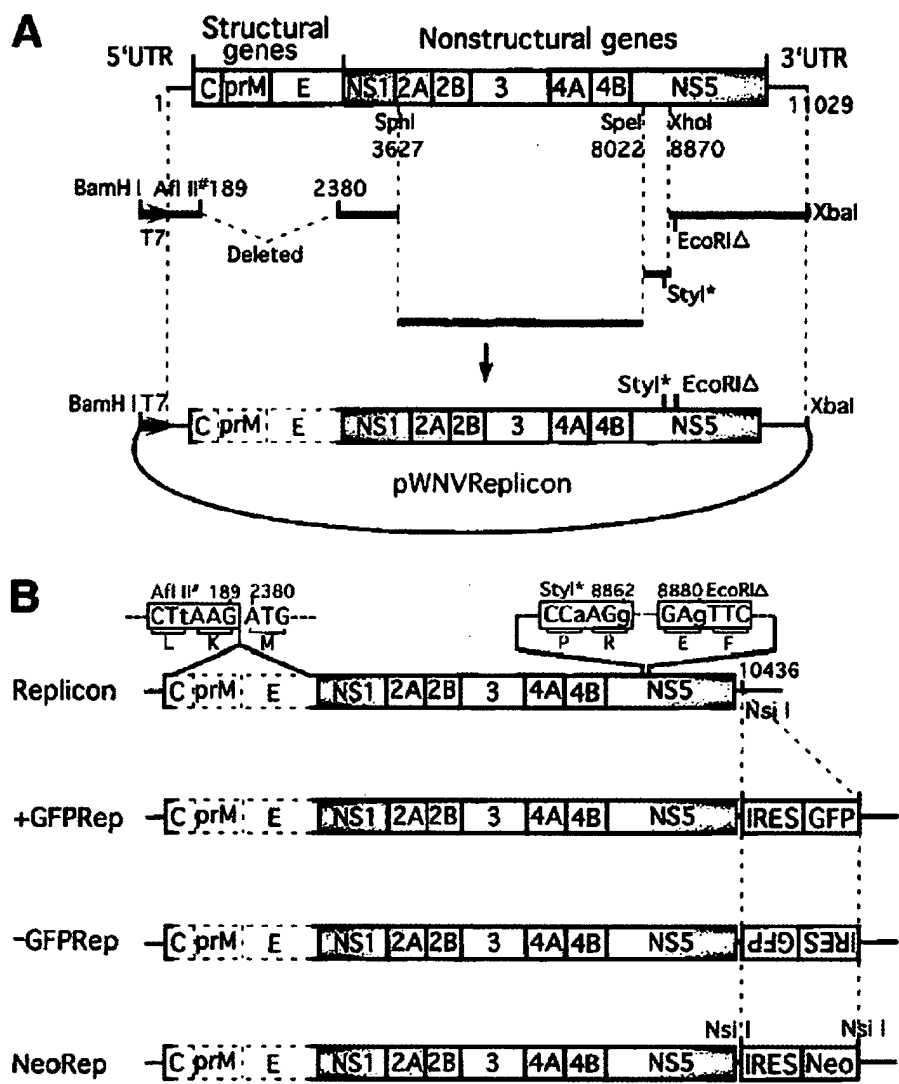


FIG. 8

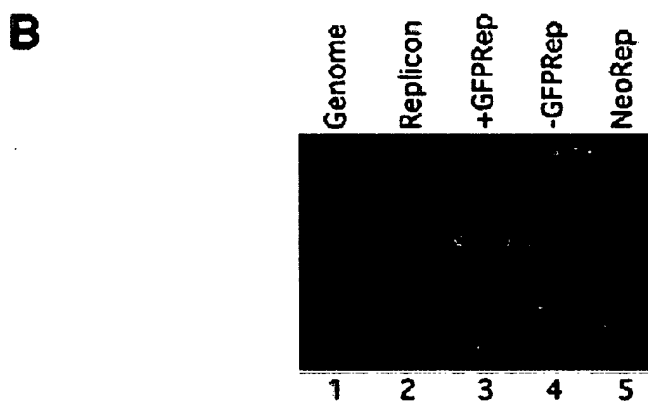
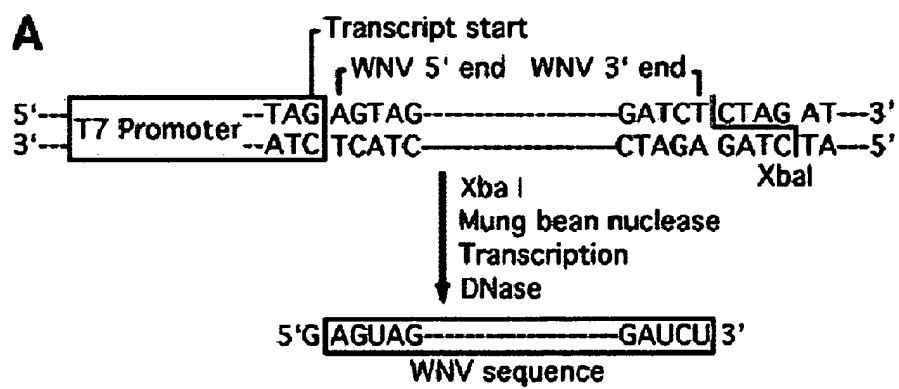


FIG. 9

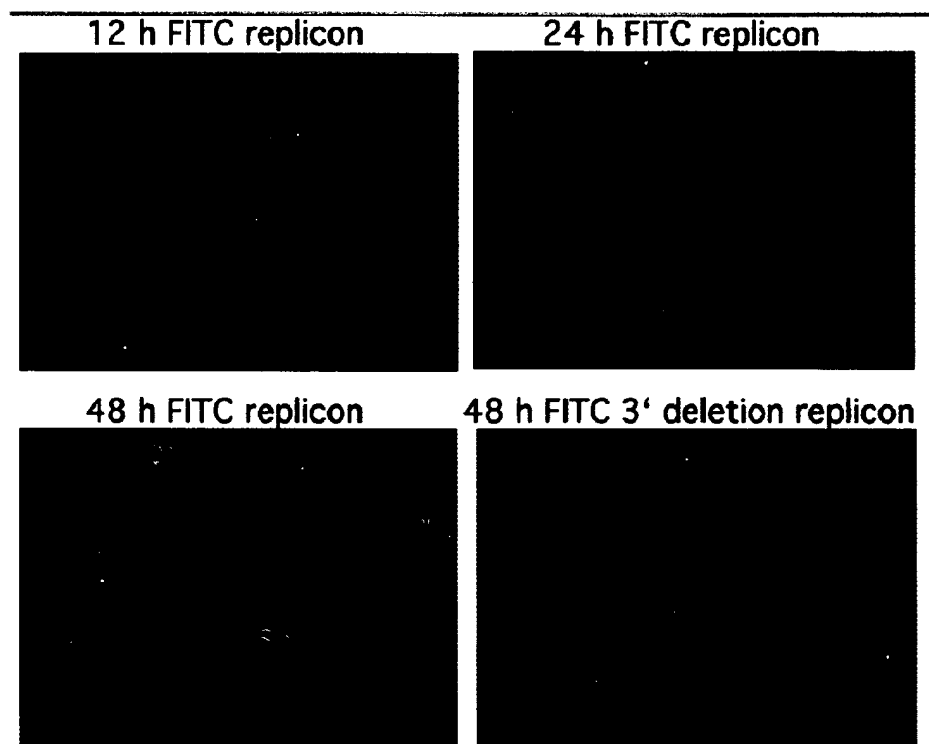


FIG. 10

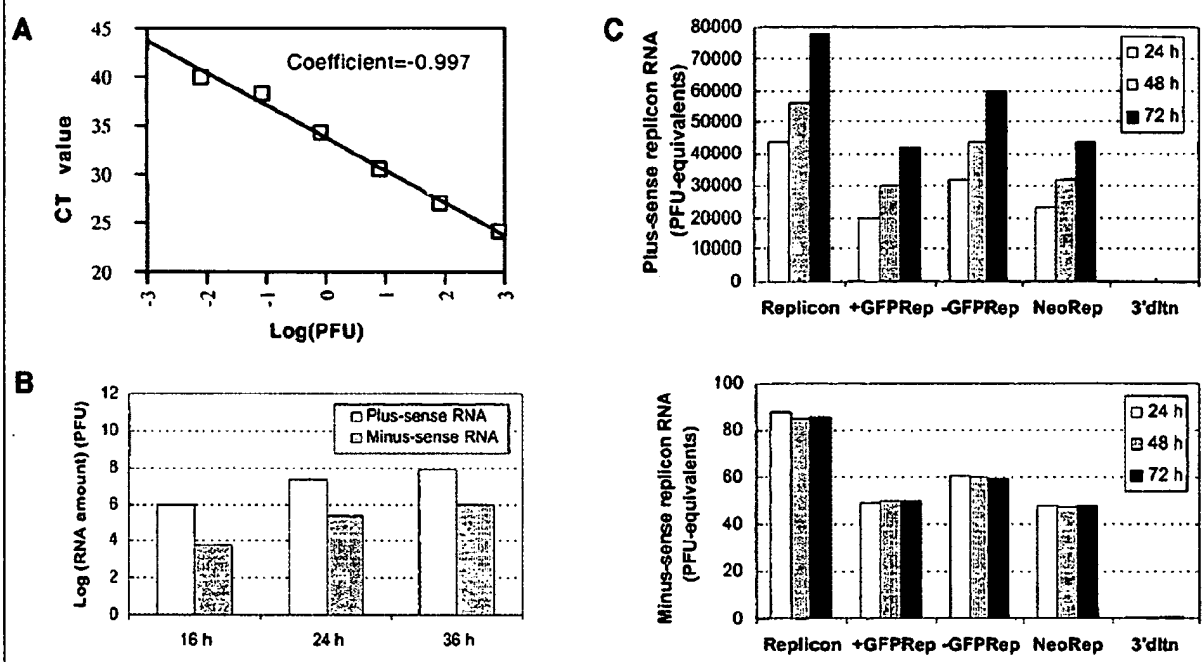


FIG. 11

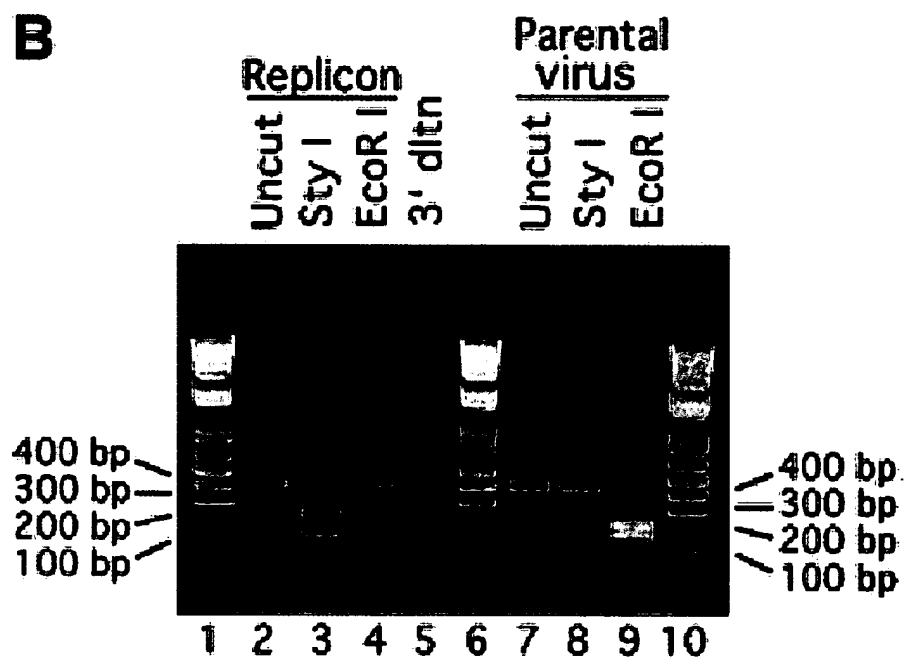
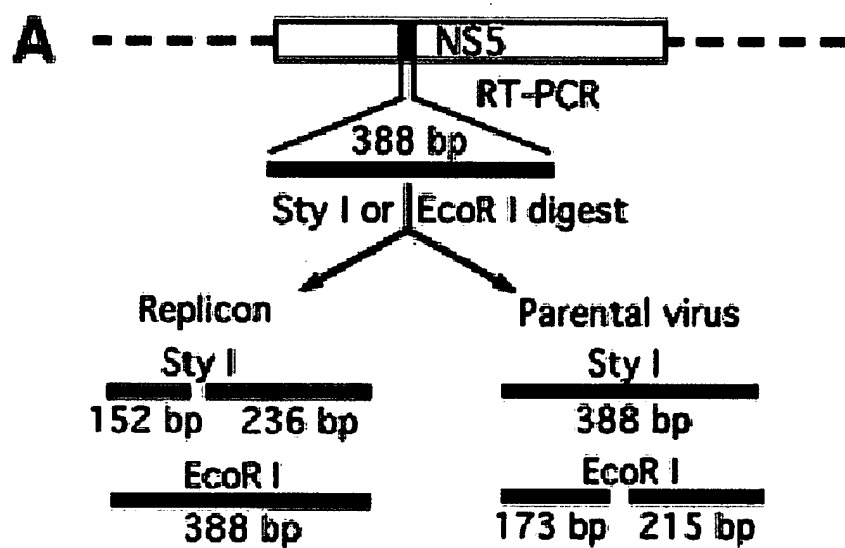


FIG. 12

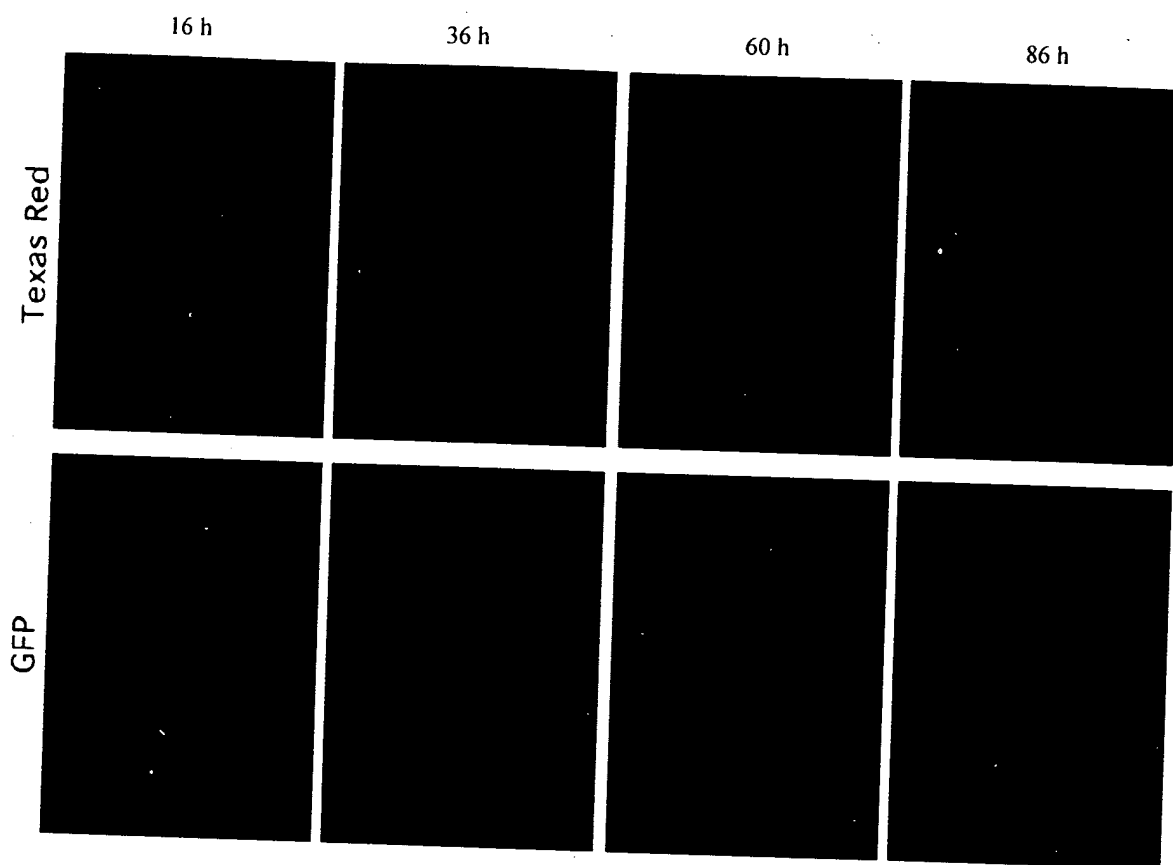


FIG. 13

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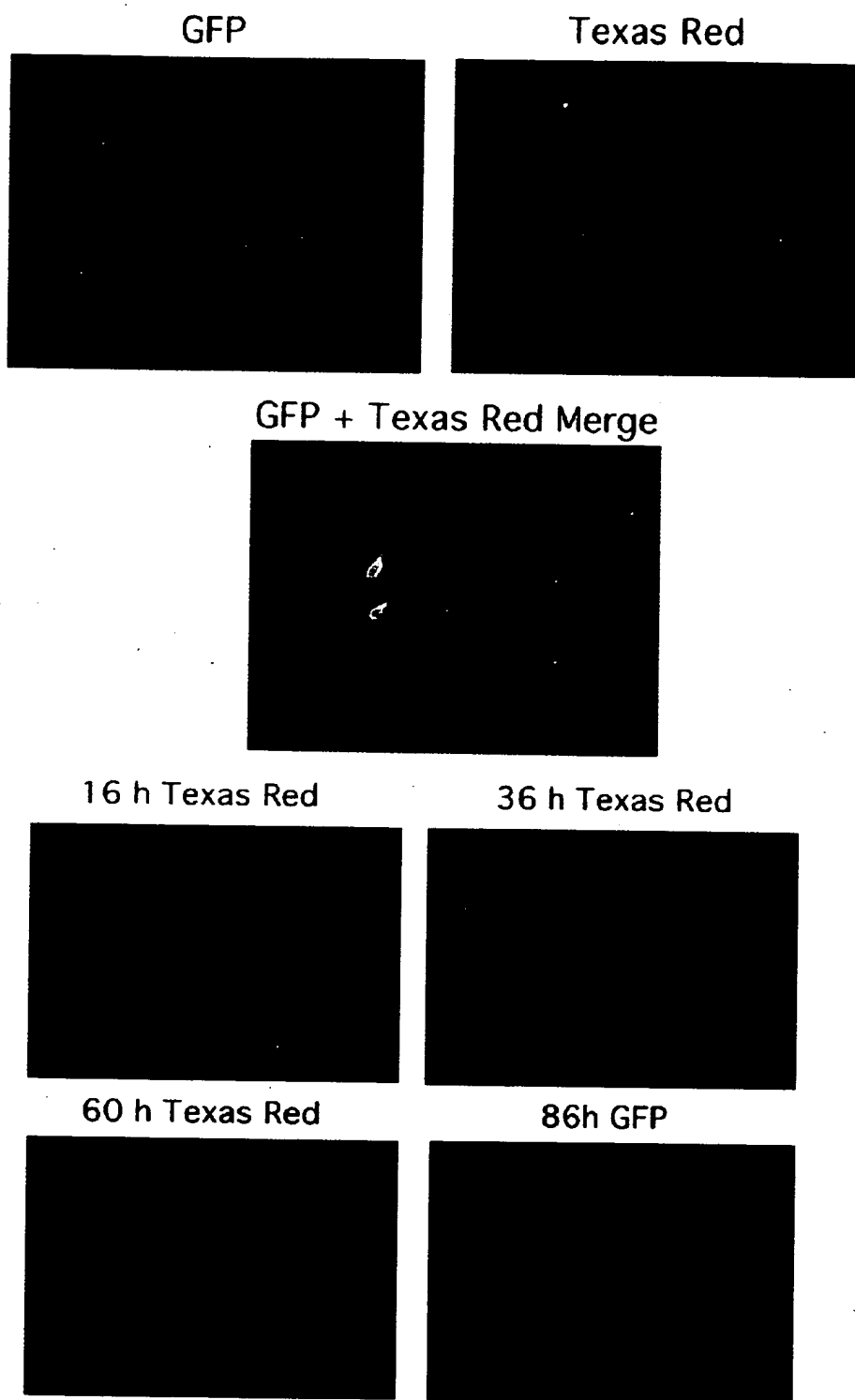
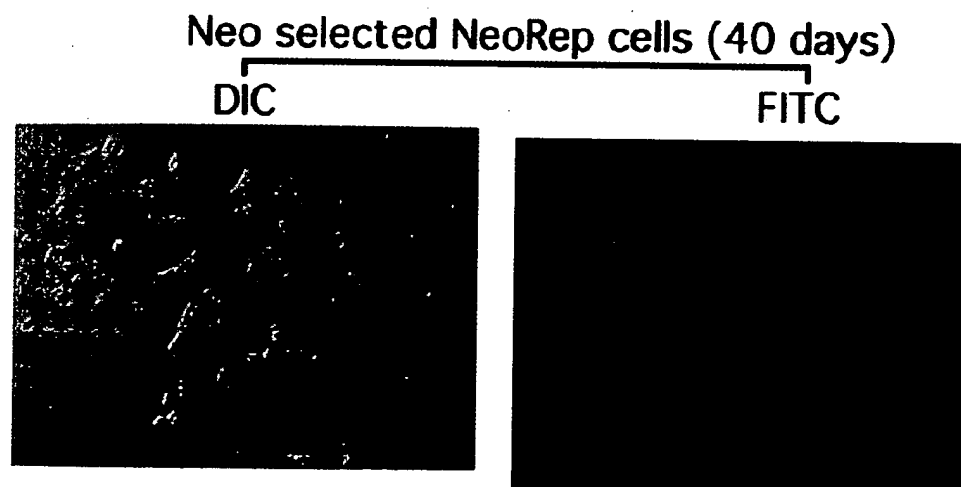
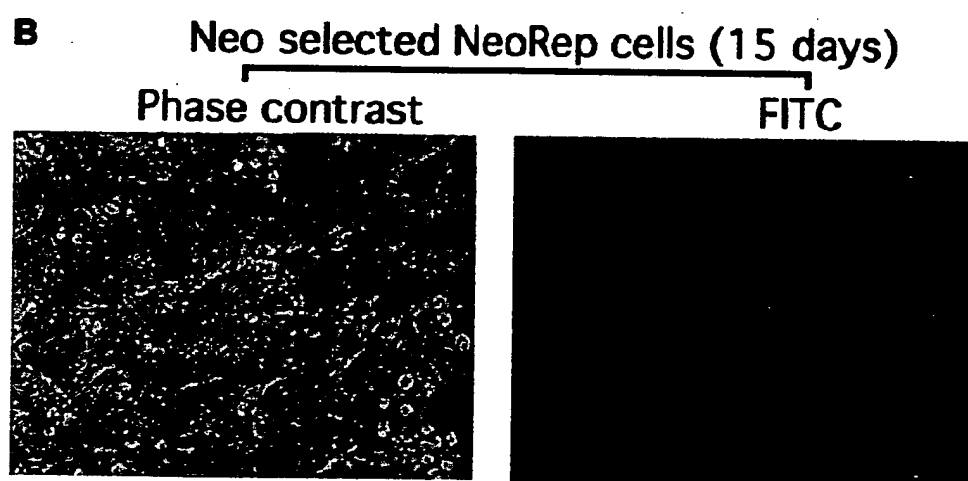
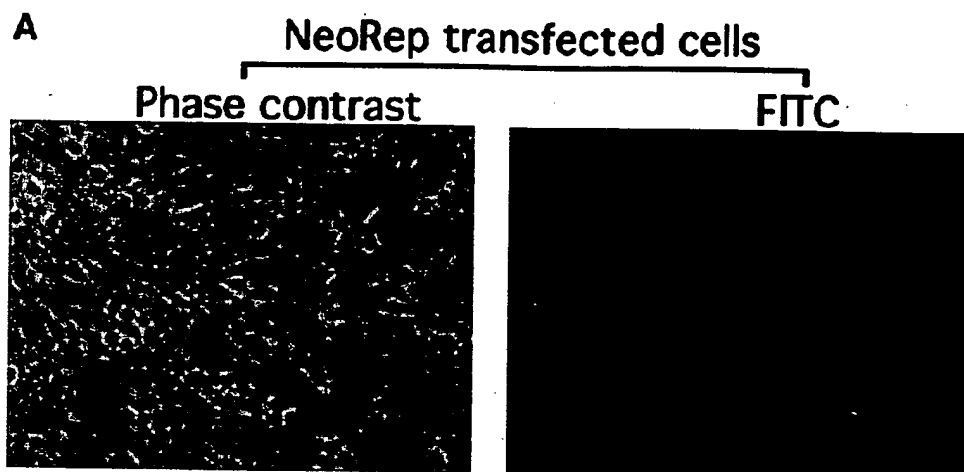


FIG. 14

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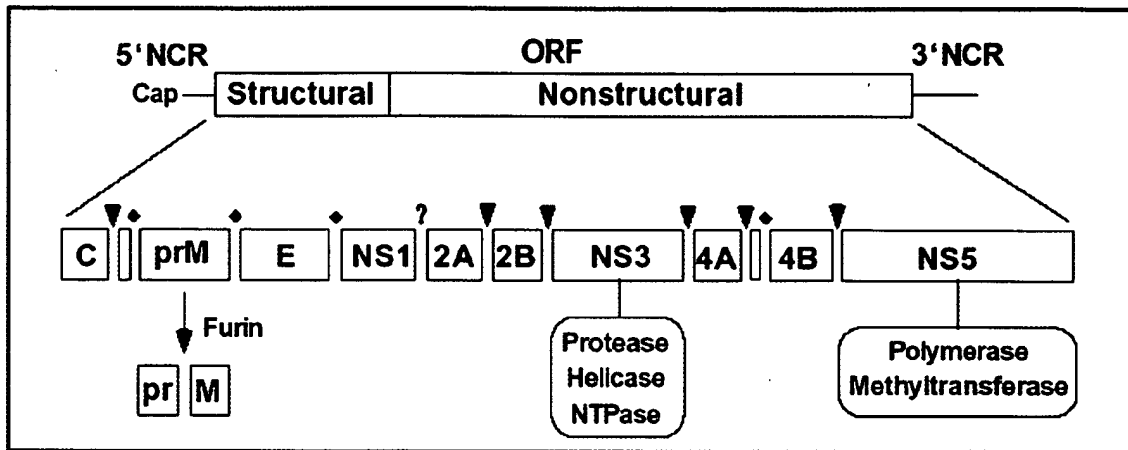


FIG. 16

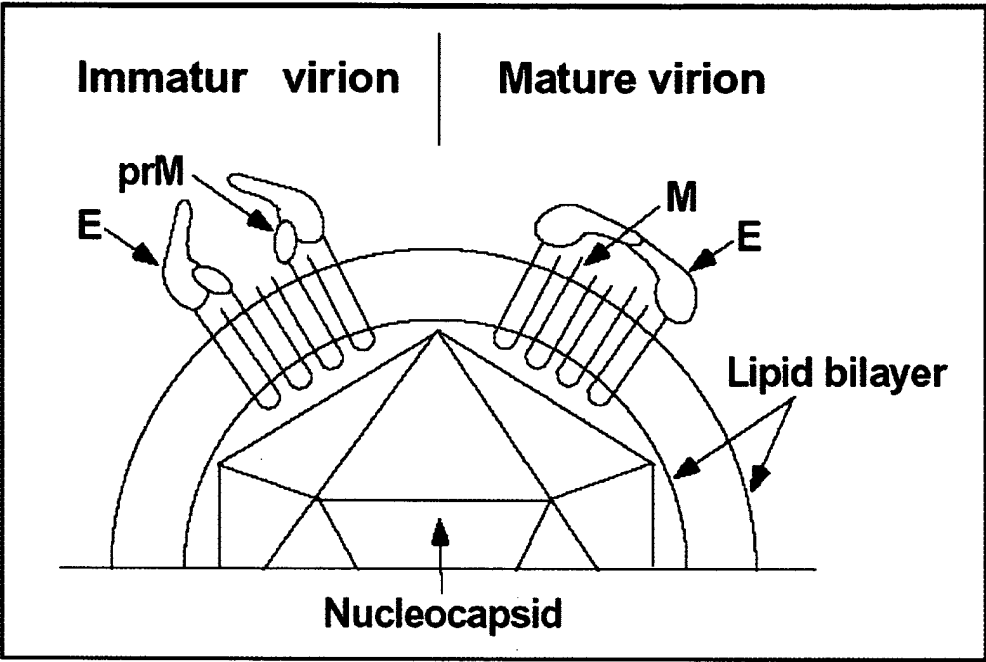


FIG. 17

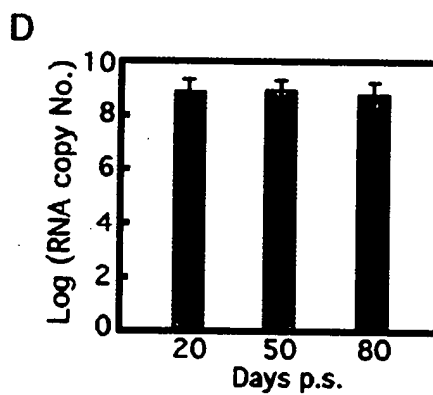
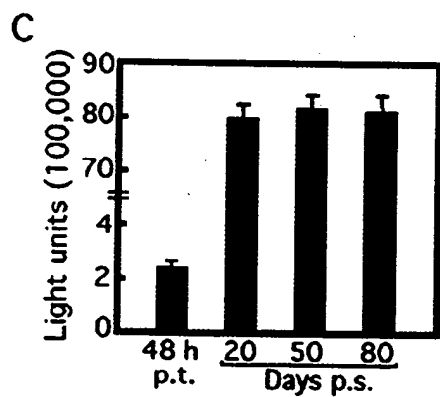
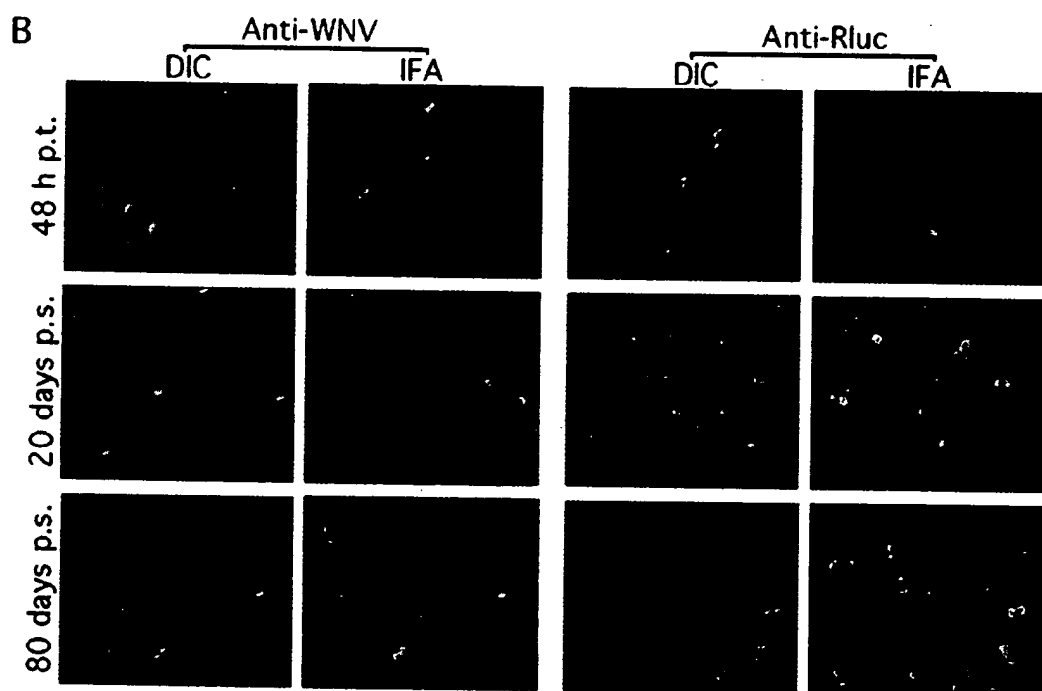
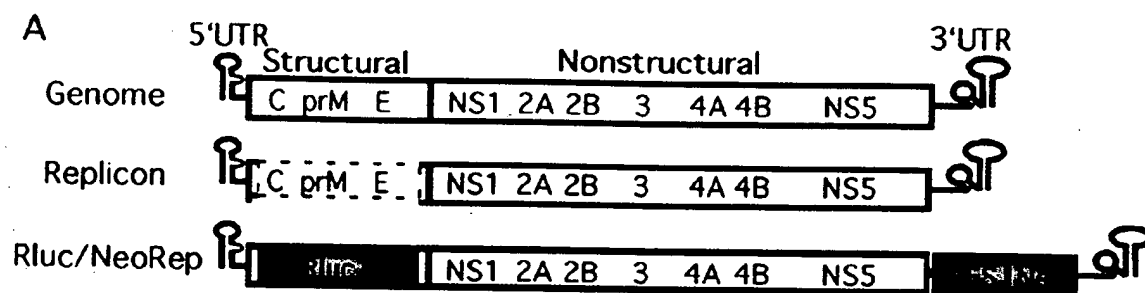


FIG. 18

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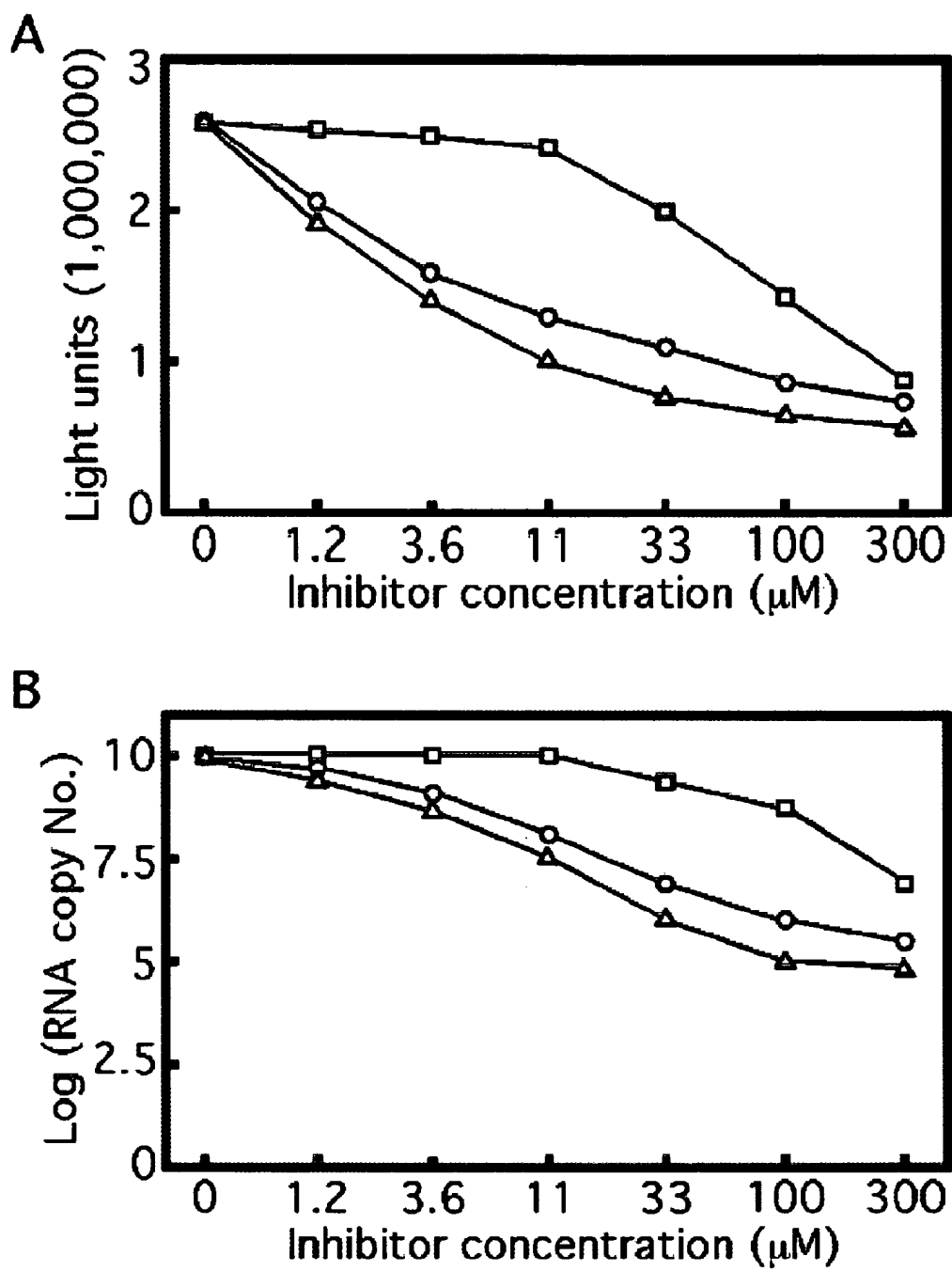


FIG. 19

Complete Nucleotide Sequence of Lineage I WNV Strain 3356 GenBank accession N. AF404756
(Nucleotide positions indicated in bold underline are different than corresponding positions of FIG. 2)

FIG. 20 a

```

1      agtagttcgc ctgtgtgagc tgacaaactt agtagtgttt gtgaggatta acaacaatta
61     acacagtgcg agctgtttct tagcacgaag atctcgatgt ctaagaaacc aggagggccc
121    ggcaagagcc gggctgtcaa tatgctaaaa cgcggaatgc cccgctgttt gtccttgatt
181    ggactgaaga gggctatgtt gagcctgacg gacggcaagg ggccaatacg atttgtgttg
241    gctctcttgg cgttcttcag gttcacagca attgctccga cccgagcagt gctggatcga
301    tggagaggtg tgaacaaaca aacagcagtg aaacaccttc tgagttttta gaaggaacta
361    gggaccttga ccagtgcctat caatcggcgg agctcaaaac aaaagaaaag aggaggaaaag
421    accggaattg cagtcgatgat tggcctgacg gccagcgtag gagcagttac cctctctaac
481    ttccaaggga aggtgatgat gacggtaaat gctactgacg tcacagatgt catcacgatt
541    ccaacagctg ctggaagaa cctatgcatt gtcagagcaa tggatgtggg atacatgtgc
601    gatgatacta tcacttatga atgcccagtg ctgtcggctg gtaatgatcc agaagacatc
661    gactgttggg gcacaaagtc agcagtctac gtcaggtagt gaagatgcac caagacacgc
721    cactcaagac gcagtcggag gtcactgaca gtgcagacac acggagaaaag cactctagcg
781    aacaagaagg gggcttggat ggacagcacc aaggccacaa ggtatttggg aaaaacagaa
841    tcatggatct tgaggaaccc tggatatgcc ctggtggcag ccgtcatttg ttggtatgctt
901    gggagcaaca ccatgcagag agttgtgttt gtctgtctat tgcttttggg ggccccagct
961    tacagcttca actgccttgg aatgagcaac agagacttct tggaaggagt gctctggagca
1021   acatgggtgg atttggttct cgaaggcgac agctgcgtga ctatcatgtc taaggacaag
1081   cctaccatcg atgtgaagat gatgaatatg gaggcggcca acctggcaga ggtccgcagt
1141   tattgtctatt tggctaccgt cagcgatctc tccaccaaag ctgcgtgccc gaccatggga
1201   gaagctcaca atgacaaacg tgctgaccca gcttttgtgt gcagacaagg agtggtggac
1261   aggggctggg gcaacggctg cggatttatt ggcaaaggaa gcattgacac atgcgccaaa
1321   tttgcttgcg ctaccaaggc aataggaaga accatcttga aagagaatat caagtacgaa
1381   gtggccattt ttgtccatgg accaactact gtggagtcgc acggaaacta ctccacacag
1441   gttggagcca ctcaggcagg gagattcagc atcactcctg cggcgccctc atacacacta
1501   aagcttggag aatatggaga ggtgacagtg gactgtgaac cacggtcagg gattgacacc
1561   aatgcatact acgtgatgac tgttggaaac aagacgttct tgggtccatcg tgagtgttcc
1621   atggacctca acctcccttg gagcagtgct ggaagtactg tgtggaggaa cagagacagc
1681   ttaatggagt ttgaggaacc acacgccacg aagcagctcg tgatagcatt gggctcacaa
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1861   ggaacaacct atggcgtctg ttcaaaggct ttcaagtttc ttgggactcc cgcagacaca
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1981   cctatctcgt cagtggcttc attgaacgac ctaacgccag tgggcagatt ggtcactgtc
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2281   gggaaggctg tccatcaagt gttcggagga gcattccgct tactgttcgg aggcattgcc
2341   tggataacgc aaggattgct gggggctctc ctgttgtgga tgggcatcaa tgctcgtgat
2401   aggtccatag ctctcacgtt tctcgcagtt ggaggagttc tgctcttcc ctccgtgaac
2461   gtgcacgctg acactgggtg tgccatagac atcagccggc aagagctgag atgtggaagt
2521   ggagtgttca tacacaatga tgtggaggct tggatggacc gatacaagta ttaccctgaa
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2641   cgatcagttt ccagactgga gcacaaatg tgggaagcag tgaaggacga gctgaacact
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2761   aagtcagcac ctaaagcctt caccgccacc acggaaaaat tggaaatttg ctggaaggcc
2821   tggggaaaga gtattttatt tgcaccagaa ctgcaccaaca acacctttgt ggttgatggt
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3001   gaatgtgact cgaagatcat tggaacggct gtcaagaaca acttggcgat ccacagtgc
3061   ctgtcctatt ggattgaaag caggctcaat gatacgtgga agcttgaaag ggcagttctg
3121   ggtgaagtca aatcatgtac gtggcctgag acgcatacct tgtggggcga tggaatcctt
3181   gagagtgact tgataatacc agtcacactg gcgggaccac gaagcaatca caatcggaga

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Complete Nucleotide Sequence of Lineage I WNV Strain 3356 GenBank accession No. AF404756
(Nucleotide positions indicated in bold underline are different than corresponding positions of FIG. 2)

FIG. 20 b

```

3241 cctgggtaca agacacaaaa ccagggccca tgggacgaag gccgggtaga gattgacttc
3301 gattactgcc caggaactac gggtaccctg agtgagagct gcggacaccg tggacctgcc
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3781 caaccagtgt ttatgggtgg atcgtttctc aaagcgagat ggaccaacca ggagaacatt
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6241 ccagtttggc tggcttaca gggtgcagcg gctggagtgt cataccacga ccggagggtg
6301 tgctttgatg gtcctaggac aaacacaatt ttagaagaca acaacgaagt ggaagtcac
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```

Complete Nucleotide Sequence of Lineage I WNV Strain 3356 GenBank accession No. AF404756
(Nucleotide positions indicated in bold underline are different than corresponding positions of FIG. 2)

FIG. 20 c

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6421 gatcaccagg cactaaaggc gttcaaggac ttcgcctcgg gaaaacgttc tcagataggg
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6841 caacgttcgc agacagacaa ccagctagcc gtgttcctga tttgtgtcat gacccttgtg
6901 agcgcagtgg cagccaacga gatgggttgg ctagataaga ccaagagtga cataagcagt
6961 ttgtttgggc aaagaattga ggtcaaggag aatttcagca tgggagagtt tcttctggac
7021 ttgaggccgg caacagcctg gtcactgtac gctgtgacaa cagcggctct cactccactg
7081 ctaaagcatt tgatcacgtc agattacatc aacacctcat tgacctcaat aaacgttcag
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8941 tggaggagcg ccagagaggc agttgaagat ccaaaatttt gggagatggg ggatgaggag
9001 cgcgaggcac atctgcgggg ggaatgtcac acttgcattht acaacatgat gggaaagaga
9061 gagaaaaaac ccggagagtt cggaaaaggc aagggaagca gagccatttg gttcatgtgg
9121 ctgggagctc gctttctgga gttcgaggct ctgggttttc tcaatgaaga ccactggctt
9181 ggaagaaaga actcaggagg aggtgtcgag ggcttgggcc tccaaaaact gggttacatc
9241 tgcgtggaag ttggcaccgg gcctgggggc aagatctatg ctgatgacac agctggctgg
9301 gacacccgca tcacgagagc tgacttgga aatgaagcta aggtgcttga gctgcttgat
9361 ggggaacatc ggcgtcttgc cagggccatc attgagctca cctatcgtca caaagttgtg
9421 aaagtgatgc gcccggtgc tgatggaaga accgtcatgg atgttatctc cagagaagat
9481 cagaggggga gtggacaagt tgtcacctac gccctaaaca ctttccacca cctggccgtc
9541 cagctggtga ggatgatgga aggggaagga gtgattggcc cagatgatgt ggagaaactc
9601 acaaaaggga aaggacccaa agtcaggacc tggctgtttg agaatgggga agaaagactc

```

Complete Nucleotide Sequence of Lineage I WNV Strain 3356 GenBank accession No. AF404756
(Nucleotide positions indicated in bold underline are different than corresponding positions of FIG. 2)

FIG. 20 d

```

9661 agccgcatgg ctgtcagtgg agatgactgt gtggtaaagc ccctggacga tcgctttgcc
9721 acctcgctcc acttcctcaa tgctatgtca aagggttcga aagacatcca agagtggaaa
9781 ccgtcaactg gatggtatga ttggcagcag gttccatttt gctcaaacca tttacttgaa
9841 ttgatcatga aagatggaag aacactgggt gttccatgcc gaggacagga tgaattggta
9901 ggcagagctc gcatatctcc aggggccgga tggaaactcc gcgacactgc ttgtctggct
9961 aagtcttatg cccagatgtg gctgcttctg tacttccaca gaagagacct gcggctcatg
10021 gccaacgcca tttgctccgc tgctccctgt aattgggtcc ctaccggaag aaccacgtgg
10081 tccatccatg caggaggaga gtggatgaca acagaggaca tggtggaggt ctggaaccgt
10141 gtttgatag aggagaatga atggatggaa gacaaaaccc cagtggagaa atggagtgc
10201 gtcccatatt caggaaaacg agaggacatc tgggtgtggca gcctgattgg cacaagagcc
10261 cgagccacgt gggcagaaaa catccaggtg gctatcaacc aagtcagagc aatcatcgga
10321 gatgagaagt atgtggatta catgagttca ctaaagagat atgaagacac aactttggtt
10381 gaggacacag tactgtagat atttaataca ttgtaaatag acaatataag tatgcataaa
10441 agtgtagttt tatagtagta tttagtgggt ttagtgtaaa tagttaagaa aattttgagg
10501 agaaagtcag gccgggaagt tcccgccacc ggaagttgag tagacggtgc tgcctgcgac
10561 tcaacccacg gaggactggg tgaacaaagc cgcaagtga tccatgtaag ccctcagaac
10621 cgtctcgga gaggacccc acatgttgta acttcaaagc ccaatgtcag accacgctac
10681 ggcgtgctac tctgcggaga gtgcagtctg cgatagtgcc ccaggaggac tgggttaaca
10741 aaggcaaacc aacgcccac gcggccctag ccccggtaat ggcgtaacc agggcgaaag
10801 gactagaggt tagaggagac cccgcggttt aaagtgcacg gccagcctg gctgaagctg
10861 taggtcaggg gaaggactag aggttagtgg agaccccggt ccacaaaaca ccacaacaaa
10921 acagcatatt gacacctggg atagactagg agatcttctg ctctgcacaa ccagccacac
10981 ggcacagtgc gccgacaatg gtggctgggt gtgcgagaac acaggatct
//

```

C mplete Nucleotide Sequence f Fully-Infecti us Lineage I WNV cDNA Cl ne of Strain 3356
(Nucleotide positions different from FIG. 20 are shown in bold underline)

FIG. 21 a

1	agtagttcgc	ctgtgtgagc	tgacaaactt	agtagtgttt	gtgaggatta	acaacaatta
61	acacagtgcg	agctgtttct	tagcacgaag	atctcgatgt	ctaagaaacc	aggagggccc
121	ggcaagagcc	gggctgtcaa	tatgctaaaa	cgcggaatgc	cccgcgtggt	gtccttgatt
181	ggactgaaga	gggctatggt	gagcctgatc	gacggcaagg	ggccaatacg	atttgtgttg
241	gctctcttgg	cgttcttcag	gttcacagca	attgctccga	cccgagcagt	gctggatcga
301	tggagaggtg	tgaacaaaca	aacagcgatg	aaacaccttc	tgagttttta	gaaggaacta
361	gggaccttga	ccagtgtctat	caatcggcgg	agctcaaaac	aaaagaaaag	aggaggaaaag
421	accggaattg	cagtcatgat	tggcctgatc	gccagcgtag	gagcagttac	cctctctaac
481	ttccaaggga	aggtgatgat	gacggtaaat	gctactgacg	tcacagatgt	catcacgatt
541	ccaacagctg	ctggaaagaa	cctatgcatt	gtcagagcaa	tggatgtggg	atacatgtgc
601	gatgatacta	tcacttatga	atgccagtg	ctgtcggctg	gtaatgatcc	agaagacatc
661	gactgttggg	gcacaaagtc	agcagtctac	gtcaggtatg	gaagatgcac	caagacacgc
721	cactcaagac	gcagtccggag	gtcactgaca	gtgcagacac	acggagaaaag	cactctagcg
781	aacaagaagg	gggcttggat	ggacagcacc	aaggccacaa	ggtatttggg	aaaaacagaa
841	tcatggatct	tgaggaaccc	tggatatgcc	ctggtggcag	ccgtcattgg	ttggatgctt
901	gggagcaaca	ccatgcagag	agttgtgttt	gtcgtgctat	tgcttttggg	ggccccagct
961	tacagcttca	actgccttgg	aatgagcaac	agagacttct	tgggaaggag	tctggagca
1021	acatgggtgg	atttggttct	cgaaggcgac	agctgcgtga	ctatcatgtc	taaggacaag
1081	cctaccatcg	atgtgaagat	gatgaatatg	gaggcggcca	acctggcaga	ggtccgcagt
1141	tattgctatt	tggctaccgt	cagcgatctc	tccaccaaag	ctgcgtgcc	gaccatggga
1201	gaagctcaca	atgacaaacg	tgctgacca	gcttttgtgt	gcagacaagg	agtgtggac
1261	aggggctggg	gcaacggctg	cgga C tattt	ggcaaaggaa	gcattgacac	atgcgccaaa
1321	tttgccctgct	ctaccaaggc	aataggaaga	accatcttga	aagagaatat	caagtacgaa
1381	gtggccattt	ttgtccatgg	accaactact	gtggagtcgc	acggaaacta	ctccacacag
1441	gttgagacca	ctcaggcagg	gagattcagc	atcactcctg	cggcgccctc	atacacacta
1501	aagcttggag	aatatggaga	ggtgacagtg	gactgtgaac	cacggtcagg	gattgacacc
1561	aatgcatact	acgtgatgac	tggtggaaca	aagacgttct	tgggtccatcg	tgagtgggtt
1621	atggacctca	acctcccttg	gagcagtgtc	ggaagtactg	tgtggaggaa	cagagagacg
1681	ttaatggagt	ttgaggaacc	acacgccacg	aagcagtctg	tgatagcatt	gggctcacia
1741	gaggggagctc	tgcatcaagc	tttggctgga	gccattcctg	tggaaatttc	aagcaacact
1801	gtcaagttga	cgtcgggtca	tttgaagtgt	agagtgaaga	tggaaaaatt	gcagtgaag
1861	ggaacaacct	atggcgtctg	ttcaaaggct	ttcaagtttc	ttgggactcc	cgcagacaca
1921	ggtcacggca	ctgtggtgtt	ggaattgcag	tacactggca	cggatggacc	ttgtaaagtt
1981	cctatctcgt	cagtggcttc	attgaacgac	ctaacgccag	tgggcagatt	ggtcactgtc
2041	aacccttttg	tttcagtggc	cacggccaac	gctaaggctc	tgattgaatt	ggaaccacc
2101	tttgagact	catacatagt	ggtgggcaga	ggagaacaac	agatcaatca	ccattggcac
2161	aagtctggaa	gcagcattgg	caaagccttt	acaaccaccc	tcaaaggagc	gcagagacta
2221	gccgctctag	gagacacagc	ttgggacttt	ggatcagttg	gaggggtgtt	cacctcagtt
2281	gggaaggctg	tccatcaagt	gttcggagga	gcattccgct	tactgttcgg	aggcatgtcc
2341	tggataacgc	aaggattgct	gggggctctc	ctgttgtgga	tgggcaccaa	tgctcgtgat
2401	aggtccatag	ctctcacgtt	tctcgcagtt	ggaggagttc	tgctcttcct	ctccgtgaac
2461	gtgcacgctg	acactgggtg	tgccatagac	atcagccggc	aagagctgag	atgtggaagt
2521	ggagtgttca	tacacaatga	tgtggaggct	tggatggacc	gatacaagta	ttaccctgaa
2581	acgccacaag	gcctagccaa	gatcattcag	aaagctcata	aggaaggagt	gtgcggtcta
2641	cgatcagttt	ccagactgga	gcatcaaatg	tgggaagcag	tgaaggacga	gctgaacact
2701	cttttgaagg	agaatggtgt	ggaccttagt	gtcgtggttg	agaaacagga	gggaatgtac
2761	aagtcagcac	ctaaacgcct	caccgccacc	acggaaaaat	tggaaatttg	ctggaaggcc
2821	tggggaaaga	gtattttatt	tgaccagaa	ctcgccaaca	acacctttgt	ggttgatggt
2881	ccggagacca	aggaatgtcc	gactcagaat	cgcgcttgga	atagcttaga	agtggaggat
2941	tttggaattg	gtctcaccag	cactcggatg	ttcctgaagg	tcagagagag	caacacaact
3001	gaatgtgact	cgaagatcat	tggaaaggct	gtcaagaaca	acttggcgat	ccacagtgc
3061	ctgtcctatt	ggattgaaag	caggctcaat	gatacgtgga	agcttgaaag	ggcagttctg
3121	ggtgaagtca	aatcatgtac	gtggcctgag	acgcatacct	tgtggggcga	tggaatcctt
3181	gagagtgact	tgataatacc	agtcacactg	gcgggaccac	gaagcaatca	caatcggaga

Complete Nucleotide Sequence of Fully-Infectious Lineage I WNV cDNA Clone of Strain 3356
(Nucleotide positions different from FIG. 20 are shown in bold underline)

FIG. 21 b

```

3241 cctgggtaca agacacaaaa ccagggccca tgggacgaag gccgggtaga gattgacttc
3301 gattactgcc caggaactac ggtcaccctg agtgagagct gcggacaccg tggacctgcc
3361 actcgacca ccacagagag cggaaagtgt ataacagatt ggtgctgcag gagctgcacc
3421 ttaccaccac tgcgctacca aactgacagc ggctgttggg atgggtatgga gatcagacca
3481 cagagacatg atgaaaagac cctcgtgcag tcacaagtga atgcttataa tgctgatatg
3541 attgaccctt ttcagttggg ccttctggtc gtgttcttgg ccaccaggga ggtccttcgc
3601 aagaggtgga cagccaagat cagcatgcca gctatactga ttgctctgct agtcctgggtg
3661 tttgggggca ttacttacac tgatgtgtta cgctatgtca tcttgggtgg ggcagctttc
3721 gcagaatcta attcgggagg agacgtggta cacttggcgc tcatggcgac cttcaagata
3781 caaccagtgt ttatggtggc atcgtttctc aaagcgagat ggaccaacca ggagaacatC
3841 ttggtgatgt tggcggctgt tttctttcaa atggcttatc acgatgcccg ccaaattctg
3901 ctctgggaga tccctgatgt gttgaattca ctggcggtag cttggatgat actgagagcc
3961 ataacattca caacgacatc aaacgtggtt gttccgctgc tagccctgct aacaccggg
4021 ctgagatgct tgaatctgga tgtgtacagg atactgctgt tgatggctcg aataggcagc
4081 ttgatcaggg agaagaggag tgcagctgca aaaaagaaag gagcaagtct gctatgcttg
4141 gctctagcct caacaggact tttcaacccc atgacccctg ctgctggact gttacatgt
4201 gatcccaacc gtaaacgcgg atggcccgcg actgaagtga tgacagctgt cggcctgatg
4261 tttgccatcg tcggagggct ggacagagctt gacattgact ccatggccat tccaatgact
4321 atcgcggggc tcatgtttgc tgctttctgt atttctggga aatcaacaga tatgtggatt
4381 gagagaacgg cggacatttc ctgggaaagt gatgcagaaa ttacaggctc gagcgaaaga
4441 gttgatgtgc ggcttgatga tgatggaaac ttccagctca tgaatgatcc aggagcact
4501 tggaagatat ggatgctcag aatggtctgt ctgcgatta gtgcgtacac cccctgggca
4561 atcttgccct cagtagttgg attttgata actctccaat acacaaagag aggaggcgtg
4621 ttgtgggaca ctccctcacc aaaggagtac aaaaaggggg acacgaccac cggcgtctac
4681 aggatcatga ctctgggct gctcggcagt tatcaagcag gagcgggctg gatggttgaa
4741 ggtgttttcc acaccctttg gcatacaaca aaaggagccg ctttgatgag cggagagggc
4801 cgctgggacc catactgggg cagtgtccaag gaggatcgac tttgttacgg aggaccctgg
4861 aaattgcagc acaagtggaa cgggcaggat gaggtgcaga tgattgtggt ggaacctggc
4921 aagaacgtta agaacgtcca gacgaaacca ggggtgttca aaacacctga aggagaaatc
4981 ggggcccgtga ctttgactt cccactgga acatcaggct caccaatagt ggacaaaaac
5041 ggtgatgtga ttgggcttta tggcaatgga gtcataatgc ccaacggctc atacataagc
5101 gcgatagtgc aggtgaaaag gatggatgag ccaatcccag ccggattcga acctgagatg
5161 ctgaggaaaa aacagatcac tgtactggat ctccatcccg gcgccggtaa aacaaggagg
5221 attctgccac agatcatcaa agaggccata aacagaagac tgagaacagc cgtgctagca
5281 ccaaccaggg ttgtggctgc tgagatggct gaagcactga gaggactgcc catccggtac
5341 cagacatccg cagtggccag agaacataat ggaaatgaga ttgttgatgt catgtgtcat
5401 gctaccctca cccacaggct gatgtctcct cacagggtgc cgaactacaa cctgttcgtg
5461 atggatgagg ctcatctcac cgaccagct agcattgcag caagagggtta catttccaca
5521 aaggtcgagc taggggaggc ggcggcaata ttcatgacag ccaccccacc aggcacttca
5581 gatccattcc cagagtccaa ttcaccaatt tccgacttac agactgagat cccggatcga
5641 gcttggaact ctggatacga atggatcaca gaatacccg ggaagacggt ttggtttgtg
5701 cctagtgtca agatggggaa tgagattgcc ctttgccctac aacgtgctgg aaagaaaagta
5761 gtccaattga acagaaagtc gtacgagacg gactacccaa aatgtaagaa cgatgattgg
5821 gactttgtta tcacaacaga catatctgaa atgggggcta actttaaggc gagcaggggtg
5881 attgacagcc ggaagagtgt gaaaccaacc atcataacag aaggagaagg gagagtgatc
5941 ctggggagaac catctgcagt gacagcagct agtgccgccc agagacgtgg acgtatcggt
6001 agaaatccgt cgcaagtgg tgatgagtac tgttatgggg ggcacacgaa tgaagacgac
6061 tcgaacttcg ccatttgac tgaggcacga atcatgctgg acaacatcaa catgccaaac
6121 ggactgatcg ctcaattcta ccaaccagag cgtgagaagg tatataccat ggtggggaa
6181 taccggctca gaggagaaga gagaaaaaac tttctggaac tgttgaggac tgcagatctg
6241 ccagtttggc tggcttaciaa ggttgacgag gctggagtgt cataccacga ccggagggtg
6301 tgctttgatg gtcctaggac aaacacaatt ttagaagaca acaacgaagt ggaagtcac
6361 acgaagcttg gtgaaaggaa gattctgagg ccgcgctgga ttgacgccag ggtgtactcg

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Complete Nucleotide Sequence of Fully-Infectious Lineage I WNV cDNA Clone of Strain 3356
(Nucleotide positions different from FIG. 20 are shown in bold underline)

FIG. 21 c

```

6421 gatcaccagg cactaaaggc gttcaaggac ttgcctcgg gaaaacgttc tcagataggg
6481 ctcattgagg ttctgggaaa gatgcctgag cacttcatgg ggaagacatg ggaagcactt
6541 gacaccatgt acgttgtggc cactgcagag aaaggaggaa gagctcacag aatggccctg
6601 gaggaactgc cagatgctct tcagacaatt gccttgattg ccttattgag tgtgatgacc
6661 atgggagtat tcttcctcct catgcagcgg aagggcattg gaaagatagg tttgggaggc
6721 gctgtcttgg gagtcgcgac ctttttctgt tggatggctg aagttccagg aacgaagatc
6781 gccggaatgt tgctgctctc ctttctctgt atgattgtgc taattcctga gccagagaag
6841 caacgttcgc agacagacaa ccagctagcc gtgttcctga tttgtgtcat gacccttgtg
6901 agcgcagtg cagccaacga gatgggttgg ctagataaga ccaagagtga cataagcagt
6961 ttgtttgggc aaagaattga ggtcaaggag aatttcagca tgggagagtt tcttTtggac
7021 ttgaggccgg caacagcctg gtcactgtac gctgtgacaa cagcggctct cactccactg
7081 ctaaagcatt tgatcacgtc agattacatc aacacctcat tgacctcaat aaacgttcag
7141 gcaagtgcac tattcacact cgcgcgaggc ttccccttcg tcgatgttgg agtgctcggt
7201 ctctgctag cagccggatg ctggggacaa gtcaccctca ccgttacggt aacagcggca
7261 aactccttt ttggcacta tgctacatg gttcccgtt ggcaagctga ggcaatgcgc
7321 tcagcccagc ggcgagacg gcccggaatc atgaagaacg ctgtagtgga tggcatcgtg
7381 gccacggacg tcccagaatt agagcgcacc acacccatca tgcagaagaa agttggacag
7441 atcatgctga tcttggtgtc tctagctgca gtagtagtga acccgtctgt gaagacagta
7501 cgagaagccg gaattttgat cacggccgca gcggtgacgc tttgggagaa tggagcaagc
7561 tctgtttgga acgcaacaac tgccatcgga ctctgccaca tcatgcgtgg gggttggtt
7621 tcatgtctat ccataacatg gacactcata aagaacatgg aaaaaccagg actaaaaaga
7681 ggtggggcaa aaggacgcac cttgggagag gtttggaag aaagactcaa ccagatgaca
7741 aaagaagagt tactaggta ccgcaaagag gccatcatcg aagtcgatcg ctcagcagca
7801 aaacacgcca ggaaagaagg caatgCact ggagggcatc cagtctctag gggcacagca
7861 aaactgagat ggctggtcga acggaggtt ctggaaccgg tcggaaggt gattgacctt
7921 ggatgtggaa gaggcggtt gtgttactat atggcaacc aaaaagagt ccaagaagtc
7981 agagggtaaca caaaggcggt tcccggacat gaagagcccc aactagtga aagttatgga
8041 tggaaacattg tcaccatgaa gagtggAgtg gatgtgttct acagaccttc tgagtgttgt
8101 gacaccctcc tttgtgacat cggagagtcc tcgtcaagtg ctgaggttga agagcatagg
8161 acgattcggg tccttgaaat ggttgaggac tggctgcacc gagggccaag ggaattttgc
8221 gtgaaggtgc tctgcccta catgccgaaa gtcatagaga agatggagct gctccaacgc
8281 cggatagggg ggggactggt cagaaaccca ctctcacgga attccacgca cgagatgtat
8341 tgggtgagtc gagcttcagg caatgtggtta cattcagtga atatgaccag ccaggtgctc
8401 ctaggaagaa tggaaaaaag gacctggaag ggaccccaat acgaggaaga tgtaacttg
8461 ggaagtggaa ccaggcggtt gggaaaaccc ctgctcaact cagacaccag taaaatcaag
8521 aacaggattg aacgactcag gcgtgagtac agttcgacgt ggcaccacga tgagaaccac
8581 ccatatagaa cctggaacta ctacggcagt tatgatgtga agcccacagg ctccgccagt
8641 tcgctggtca atggagtggg caggctcttc tcaaaacat gggacaccat cacgaatgtt
8701 accaccatgg ccatgactga cactactccc ttcgggcagc agcgagtgtt caaagagaag
8761 gtggacacga aagctcctga accgccagaa ggagtgaagt acgtgctcaa cgagaccacc
8821 aactggttgt gggcgttttt ggccagagaa aaacgtccAa gGatgtgctc tcgagaggaG
8881 ttcataagaa aggtcaacag caatgcagct ttgggtgcc a tggttgaaga gcagaatcaa
8941 tggaggagcg ccagagaggc agttgaagat ccaaaatttt gggagatggt ggatgaggag
9001 cgcgaggcac atctgcgggg ggaatgtcac acttgcatth acaacatgat gggaaaagaa
9061 gagaaaaaac ccggagagtt cggaaaaggc aagggaaagca gagccatttg gttcatgtgg
9121 Tgctttctgga gttcagggct ctgggttttc tcaatgaaga ccactggctt
9181 ggaagaaaga actcaggagg aggtgtcgag ggcttggggc tccaaaaact gggttacatc
9241 ctgctggaag ttggcaccgg gcctgggggc aagatctatg ctgatgacac agctggctgg
9301 gacaccgca tcacgagagc tgacttgga aatgaagcta aggtgcttga gctgcttgat
9361 ggggaacatc ggctccttgc cagggccatc attgagctca cctatcgtca caaagtgtgtg
9421 aaagtgatgc gcccggtgc tgatggaaga accgtcatgg atgttatctc cagagaagat
9481 cagaggggga gtggacaagt tgtcacctac gccctaaaca ctttcaccaa cctggccgtc
9541 cagctggtga ggatgatgga aggggaagga gtgattggcc cagatgatgt ggagaaactc
9601 aaaaaagga aaggacccaa agtcaggacc tggctgtttg agaattggga agaaagactc

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C mplete Nucleotide Sequence of Fully-Infectious Lineage I WNV cDNA Clone f Strain 3356
(Nucleotide positions different from FIG. 20 are shown in bold underline)

FIG. 21 d

```

9661 agccgcatgg ctgtcagtgg agatgactgt gtggtaaagc ccctggacga tcgctttgcc
9721 acctcgctcc acttcctcaa tgctatgtca aagggttcgca aagacatcca agagtggaaa
9781 ccgtcaactg gatggtatga ttggcagcag gttccatttt gctcaaacca ttctactgaa
9841 ttgatcatga aagatggaag aacactggtg gttccatgcc gaggacagga tgaattggta
9901 ggcagagctc gcatatctcc agggggccgga tggaaacgtcc gcgacactgc ttgtctggct
9961 aagtcttatg cccagatgtg gctgcttctg tacttccaca gaagagacct gcggctcatg
10021 gccaacgcca ttgtctccgc tgtccctgtg aattgggtcc ctaccggaag aaccacgtgg
10081 tccatccatg caggaggaga gtggatgaca acagaggaca tggtggaggt ctggaaccgt
10141 gtttggatag aggagaatga atggatggaa gacaaaaccc cagtggagaa atggagtgc
10201 gtcccatatt caggaaaacg agaggacatc tgggtgtggca gcctgattgg cacaagagcc
10261 cgagccacgt ggcagaaaa catccaggtg gctatcaacc aagtcagagc aatcatcgga
10321 gatgagaagt atgtggatta catgagttca ctaaagagat atgaagacac aactttggtt
10381 gaggacacag tactgtagat atttaataca ttgtaaatag acaatataag tatgcataaa
10441 agtgtagttt tatagtagta tttagtgggt ttagtgtaaa tagttaagaa aattttgagg
10501 agaaagtcag gccgggaagt tcccgccacc ggaagttgag tagacgggtc tgccctgcgac
10561 tcaaccccag gaggactggg tgaacaaagc cgcgaagtga tccatgtaag ccTtcagaac
10621 cgtctcgga ggaggacccc acatgttgta acttcaaagc ccaatgtcag accacgctac
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